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Do indicators influence communication in SEA? — Experience from the Chinese practice

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ABSTRACT

Indicators have become one of the primary tools for Strategic Environmental Assessment (SEA) in the Chinese context, but what does this use of indicators mean for communication within the SEA processes? This article explores how the selection and use of indicators influence the communication between different stakeholders involved in SEA. The article provides a conceptual communication model covering directions and level of communication. Using this model on empirical findings from interviews with two specific SEA cases and from general experience collected through an online survey, the results suggest that indicators are used mainly in internal communication although a change of approach, with more external communication and stakeholder engagement, is taking place as a consequence of working with indicators in the SEA. However, the external communication mainly involves the experts and other relevant sectors (planning, energy, land use, forestry, etc.), the involvement of the public and NGOs is still not well implemented in Chinese SEA practice, and the direction of communication is mainly one-way channel of providing information rather than a two-way channel of dialogue and participation.

1. Introduction

Debates on the traditional EIA-based SEA and a communication-based SEA have been raised frequently in the last years in the field (Gao et al., 2013; Hilden et al., 2004; Partidário, 2000; Vicente and Partidário, 2006). The traditional EIA-based SEA relies more on the technical methods and scientific prediction while the communication-based SEA emphasises more involvement and communication during the process to facilitate the integration of environmental consideration into the planning and decision making (Fischer, 2003; Partidário, 2000; Vicente and Partidário, 2006). For EIA-based SEA, indicators are commonly used as a tool to describe and monitor the environmental baseline, and measure the impacts caused by planned activities (Donnelly et al., 2007; Gudmundsson et al., 2010; Thérivel, 2004), and builds upon the rationale that by simplifying and measuring environmental phenomena, indicators provide valuable information for decision-makers, who will be willing and able to use this information.

The function of indicators can thus be divided into two aspects; a scientific function and a communicational function (Cloquell-Ballester et al., 2006; Dale and Beyeler, 2001; Gudmundsson et al., 2010). As the scientific function, indicators represent the components of a system and the complex relationships within the system (Walz, 2000). Besides their scientific, and more instrumental, role in providing evidence of impacts and trends, indicators also have a communicational function (Hammond et al., 1995; Morrone and Hawley, 1998; Schiller et al., 2001; Walz, 2000). The topic of this article is the role of indicators in supporting communication in the Chinese SEA system, which relies strongly on the use of indicators. The article discusses questions like: How and to what extent are different stakeholders involved in selecting indicators? Does the use of indicators increase communication and participation by e.g., the public and the politicians? And is the communication one-way from authorities only or do indicators support a two-way communication? The main contribution of this article is to explore the assumed linkages between indicators and communication in SEA empirically.

By communicating in a more condensed and simple form, which is believed to be more relevant for the public and policy- and decision-makers, indicators theoretically provide an arena for involvement, debate and deliberation. Other than information itself, indicators reduce the complexity of communication through aggregation and hereby support the common understanding and make communication more efficient (Hammond et al., 1995; Morrone and Hawley, 1998; Ramos, 2009; Ramos et al., 2007; Walz, 2000). By giving a general overview rather than detailed information, indicators provide comprehensibility as the communication background (Walz, 2000) and an "underlying concept of reality", and make "this world's view explicit to a specific audience, e.g., decision-makers" (Gudmundsson et al., 2010, p. 38). Playing a communicational role, indicators are believed to be able to promote accountability and improve the communication with the public (Saisana and Tarantola, 2002, p. 72). According to a survey of the selection and usage of indicators (Fischer et al., 2010), one of the reasons for using indicators in environmental and sustainable evaluation is for

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communicating to the public and decision-makers. Developing indicators together is believed to be helpful in facilitating communication with the public and decision-makers (Lyytimäki and Rosenström, 2008) and to be a good learning process for the local communities (Reed et al., 2006). The use of indicators in environmental assessment is considered to be able to encourage social learning (Berkhout et al., 2002).

In the field of SEA, according to Kørnøv and Hvidtfeldt (2003), indicators can help in understanding the environment condition, in better political steering and in smothering implementation of PPPs. Using indicators effectively is considered to be important as one of the main challenges for integrating SEA and spatial planning (Geneletti, 2011) and to improve SEA's contribution to sustainability (Noble, 2002). Thérivel (1996) emphasised the need in SEA to classify different target groups for indicators using, which is proposed by Braat (1991). Furthermore, the involvement of indicator users in designing and developing indicators was also touched upon by Donnelly et al. (2006) according to whom specific indicators to each proposed PPP should be composed by SEA practitioners during scoping, by taking the relevant and significant issues into account. In this sense, indicators' communicational function in the interaction between SEA practitioner, stakeholders, decision-makers and the public can be crucial for ensuring its effectiveness and objectivity (Gao, 2013). However, studies of using indicators in SEA in general provide little understanding of how the communication in SEA is influenced by the use of indicators.

In the Chinese context, indicators are used broadly and intensively in SEA due to the fact that SEA is still a technical-based activity that relies strongly on scientific calculation, model simulation and impact prediction. Indicators can find their usefulness in almost every stage in a SEA: in screening to decide whether to conduct a SEA and at what scale; in the scoping to decide the key objectives; in guiding data collection and in setting alternatives as well as in set targets for adaptations or mitigations; in monitoring programme and follow-up; in communicating to planners, stakeholders and or decision-makers (Gao, 2013). Use of indicators in SEA has been part of the formal procedure in Chinese SEA system and their use is emphasised by the national guidelines (Gao et al., 2013). The Technical Guidelines for Plan EIA (2003) consisting of one general guideline and 5 sectoral guidelines give recommended indicator lists for each sectoral plan SEA. It also highlights the emphasis of the core role of indicators in SEA as the most important basis for the whole assessment process (The explanation for The Technical Guidelines, revised version, 2009, p. 6) and requires that indicators should be recorded in the final SEA report (The Technical Guidelines, revised version, 2009, p. 14).The recognition of communication in SEA, and hereby the potential role for indicators, is also reflected in the SEA literature. This will be explored further in the next section with a brief review of research on communication in SEA seen from a communicative planning perspective. This section also includes a theoretical basis for how communication and communication flows are analysed in the study, and a conceptual model is set up and provides a basis for collecting and analysing the empirical data. In Section 3, on methodology, the methods applied in this study are explained followed by a short description of two Chinese SEA case studies. In Section 4 we present the results from the study: first, findings from the two case studies on how indicators are selected and used, and how indicators influence the communication and involvement in SEA, and second, findings from the general survey on practitioners' experience in using indicators to communicate in SEA and support participation. The conclusion is presented in the final section.

2. Communications, planning and SEA

2.1. A communicative changing in SEA

Influenced and inspired by planning and decision-making theory, fundamental debates regarding whether the traditional EIA-based SEA – "marked by instrumental rationality" (Fischer, 2003, p. 156) – can reflect the complex and non-instrumental reality and be effective in influencing decision-making, can be found in a vast literature (Fischer, 2003; Kørnøv and Thissen, 2000; Nilsson and Dalkmann, 2001; Partidário, 2000; Stoeglehner et al., 2009; Vicente and Partidário, 2006). A turning in the research on planning theory is relevant as one departure point for understanding the emphasis on communication when studying the integration of SEAs into planning and decision-making. Due to the observation that the traditional representative democracy cannot handle the complicated societal problems alone (Fischer, 2003; Healey, 1992, 1997; Innes, 1995), and to the observations that planners cannot always provide neutral professional information to decision makers and public, but instead spend a lot of their time communicating with various stakeholders and actors (Innes, 1998), communicative planning has been developed as an alternative to rational planning by emphasising engagement and participation. An element in this is also to make power relationships more transparent (Flyvbjerg, 1998). In a communicative planning process, a plan itself is viewed as the result of "various discourses and how different ideas have come together through language to create a particular view or plan" (Allmendinger, 2002, p. 198). And an agreed storyline means more than how the storyline is developed and what scientific knowledge the storyline is based upon (Allmendinger, 2002, p. 202). Along with the popularity of this alternative to the rational planning theory, there have been challenges regarding the role of knowledge and information, along with participation and deliberation in planning, e.g., how to sort the jumble of the massive quantity of information during the discussion (Healey, 1996). Or, based on the assumption that judgement relies more on potential than on instrumental calculation, even deeper doubt has been cast on whether profession as expert knowledge still exists in the planning process besides the different opinions (Allmendinger, 2002, p. 206).

The rise of interpretative communicative planning has also been observed in environmental assessment processes with the shift from analysis/evaluation to communication (Janssen, 2001), highlighting the communicative benefits of the assessment (Nielsen et al., 2005), as well as a new trend in decision-making and the implementation process of policy, plan or programmes (PPPs) with the involvement of multiple stakeholders, communication and participation (Fischer et al., 2010; Lam et al., 2009). Social learning through participation and engagement is seen as another benefit in environmental assessment (Diduck and Mitchell, 2003; Fitzpatrick, 2006; Partidário and Arts, 2005; Sinclair et al., 2008; Vicente and Partidário, 2006). Arguments based on the traditional EIA-based SEA – but going beyond it – for a more communication-based SEA rooted in the perspective of communicative planning (Fischer, 2003) have been proposed intensively in the last decade (Hilden et al., 2004; Partidário, 2000; Vicente and Partidário, 2006). Differing from the EIA-based SEA, a communication-based SEA calls for more participation of stakeholders and more communication within a more flexible procedure (Fischer, 2003; Partidário, 2000; Vicente and Partidário, 2006), though depending on the tier of decision-making, the need for communication differs (Fischer, 2003). The Chinese practice is also involved in this discussion (Bao et al., 2004; Che et al., 2011; Lam et al., 2009; Tang et al., 2007; Wu et al., 2011). The communication-based SEA model has been criticised, however, for placing too much emphasis on the process rather than effective outcomes (Fischer, 2003), especially considering the doubt as to whether free of power in reality can be reached (Tewdwr-Jones and Allmendinger, 1998). Therefore how to find a balance between the pure technical EIA-based SEA and the communication-based SEA is still being discussed.

2.2. Communication and flow

In his study of the act of communication, Lasswell (1948) identified four major questions concerned in studying a communication process: who says what, in which channel, to whom, and with what effect? The "who" question looks into the communicators, the "says

what" question concerns the content, the "in which channel" question studies the media, the "to whom" question explores the audience, and "with what effect" investigates the impact or the effect of the communication. The channel in our case is the use of indicators in the SEA process, and our study looks into the questions of "who" and "to whom", and at the effect aspect. The latter relates to the flow of communication and whether a possibility for dialogue is achieved. Following the same line of reasoning McLuhan criticised the common understanding of communication as "merely transporting messages from point to point". McLuhan argued that communication means change and further added that effect constitutes communication — "no effect means no communication" (McLuhan, 2008, p. 31).

On this background, one way to investigate the communication flow is to follow the direction of flows. Depending on the degree of reciprocity between communicators and audience (Lasswell, 1948), communication in the context of society can be sorted into two categories of one-way communication and two-way communication (Cutlip and Center, 1952). Grunig and Hunt (1984) further suggested that the major difference between one-way and two-way communication is whether feedback exists. One-way communication flows from communicators to the receivers. According to Grunig and Hunt, in one-way communication, the communicators' role is to inform the public of their own opinion and values without explicit feedback from the receivers/audience back to the communicators. One-way communication focuses on "speaking" but not listening (Heath, 2006). One-way communication has been criticised as there is no probability for the communicators to be challenged for their stance and value (Grunig and Hunt, 1984). One-way transmission is also described as: "scientists decide what to study and make information available to society by placing it on a 'loading dock,' then waiting for society to pick that information up and use it" (Lindenfeld et al., 2012, p. 28), while the engaged model emphasises the engagement of stakeholders and communities in producing information and understanding, and use of local knowledge (Lindenfeld et al., 2012).

By relying on "listening for and sharing valuable information as well as being responsive, respectful, candid, and honest" (Heath, 2006, p. 106), two-way communication is from the communicators to the receivers and vice versa. Rather than only disseminating information, two-way communication emphasises the participation of the receivers in the communication with feedback (Grunig and Hunt, 1984). Two kinds of two-way flow are defined by Grunig and Hunt (1984); two-way asymmetric flow and two-way symmetric flow, where the former admits the importance of feedback while the latter emphasises the interaction between communicators and receivers as a driver to change the communicators' values and opinions.

Another way to investigate communication flows is from the perspective of the boundary of flow. Depending on the formal functional positions of those involved in the communication, communication can also be sorted into internal and external communication (Johnson and Chang, 2000). In the context of organisational communication, fundamentally as a management discipline, internal communication occurs among participators within the organisation (Grunig, 1992). Internal communication can reduce confusion and resistance (Lippitt, 1997) therefore it is seen as an important factor for an effective and successful implementation (Quirke, 2008; Spike and Lesser, 1995). External communication relates to the boundary spanning in term of those involved (Johnson and Chang, 2000). Communication with external information sources supplies information for the internal users (Johnson and Chang, 2000). External communication can facilitate information feeding into the system or organisation. The distinction between internal and external communication is not clear-cut, however. Sometimes the results of external communication might feed back into internal communication that can be exported through external communication again (Nagpaul and Pruthi, 1979). Furthermore, due to the flatter structure of organisations in both formal and informal ways, it is harder to put a fixed boundary on those who should be involved in internal communication (Kitchen and Daly, 2002). Therefore internal and external communication should be defined depending upon the specific case.

3. Methodology and cases

A conceptual model to demonstrate the communication within two boundaries and in two directions is designed for this study. The approach adopted in this study is a combination of an on-line survey on general level targeting SEA practitioners, and two SEA case studies within the urban planning sector. The case studies involved documentary analysis and interviews, and will be further described and discussed in the following.

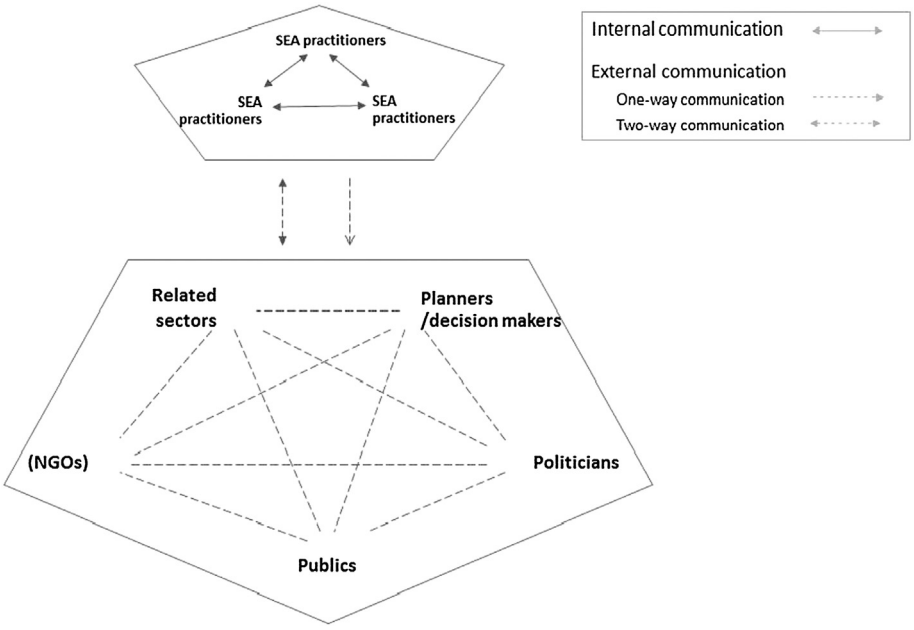

Fig. 1. Communication model used for analysing communication and flow.

3.1. A communication model

Based on these perspectives on communication reviewed in Sec. 2.2, in the conceptual model (see Fig. 1), we address constructor, participant and flow of communication within the process of selecting and using indicators in SEA. Firstly, to analyse the influence of indicators on communication there is a need to identify those involved in the communication arenas, and then clarify the communication flow among them. In the context of Chinese SEA, those participants in communication include SEA practitioners, planners in other sectors (such as energy, land use, forestry, etc.), politicians, the ordinary public and sometimes NGOs. The next step is to group the communication flows according to two categories; flow direction and flow boundary. The first category consists of both one-way communication and two-way communication. The one-way communication in this study refers to the communication that only aims at informing and transferring, while the two-way also involve feedback, interaction and participation. Since in practice the communication between the external stakeholders/sectors/actors does not necessary exist, or is not necessary one-way or two-way. So as a general model, as can be seen in Fig. 1, we leave this communication between them without specifying the directions. The second category consists of internal communication and external communication. Internal communication is between SEA practitioners within the SEA team. All other communication with stakeholders, planners and decision makers, politicians, public and sometimes NGOs, if any, is considered as external communication.

3.2. Case studies

Two SEAs of urban master plans are chosen for case study:

- SEA of Shenzhen's Master Urban Planning (2007–2020) (hereafter called the Shenzhen case) and
- SEA for the Dali Urban Development Master Plan (2008) (hereafter called the Dali case).

The case studies were undertaken within the same time period (2007–2009) with similar institutional contexts and according to the same legislation system. They both involve urban development plan which currently are among the fastest growing plans in China, besides sectoral plans. Furthermore, both cases are pilot SEAs under quality control by the Ministry of Environmental Protection of China, which were provided with the most advanced technology support. The SEA cases are undertaken by two different types of practitioners. A local research institute undertook the Shenzhen case, while the Dali case was a joint project undertaken by the local research institute and an international SEA team. Both cases are regarded as good experience in engaging stakeholders and were conducted through a communicative SEA process (Interview G04, 2011). The two cases are further described in Box 1.

The documents studied included SEA reports, planning reports, case-based reports and research publications. Besides documentary study, eight individual interviews (Table 1) were undertaken between January 2011 and June 2012. The interviews were conducted in Beijing, Shenzhen and Dali in China (face to face), and in Denmark (via phone). The interviews were taken at two levels; a general level based on the interviewee's general experience with Chinese SEA and, a case level based on the two urban planning SEA cases. The interviewees on general level are selected according to their personal experience in conducting SEA and reviewing SEA, as well as their knowledge of guidelines' formulation and implementation. The interviewees on case level are selected according to their engagement in the cases, their experience in using indicators and their understanding and knowledge of SEA in general. Each interviewee is given a code with one letter and two numbers. Letter G represents general level interviews. Letter S represents the Shenzhen case and D represents the Dali case. The numbers represent the individual interviewees.

Box 1
Two urban planning SEA cases.

Case 1SEA of Shenzhen's Master Urban Planning (2007–2020)

Shenzhen, overlooking Hong Kong, is located in southern Guangdong, China. Shenzhen has a population of 8.6 million within its area of 2000 km^2. During the past three decades, benefiting from being the first "special economic zone" Shenzhen has experienced rapid economy growth from a small town to a booming region. In response to the environmental and resource issues brought by the fast development, Shenzhen Municipality issued the first master plan in 1982 which was revised twice in 1986 (Shenzhen's Master Urban Planning 1986–2000) and 1996 (Shenzhen's Master Urban Planning 1996–2010). In 2006 the local municipality government started revising it as "Shenzhen's Master Urban Planning 2007–2020". The SEA was included in this revising process to ensure that the environmental consideration is integrated into the plan making. As one of the pilot SEAs tested by the Ministry of Environmental Protection in China, this project was undertaken by the Academy for Environmental Science in Shenzhen, and was appraised in March 2009.
Source: Che et al., 2011.

Case 2SEA for the Dali Urban Development Master Plan (2008)

Dali is one of the Autonomous Prefectures in Yunnan Province, in southwest China, with a population of 3.29 million in an area of 29,000 km^2. The rapid industrialization since the 1980s has caused degradation of the province's complex and fragile ecological systems. Yunnan has formulated strategies and action plans to address these problems. In 2007, Dali Municipal Government commenced the revision of its existing urban development master plan and simultaneously commissioned SEA for the master plan revision. The purpose of the SEA was to assess the proposed urban development objectives, population and territorial expansion, spatial layout, and planned industrial developments in the municipality. Due to delays in the formulation of the master plan, the SEA eventually ended up analysing impacts of possible development scenarios and providing related recommendations to Dali Municipal Government and the planning team. The SEA process was financed by the Dali municipality and carried out as an independent assessment that ran in parallel with an elaboration of the plan. Additional support was provided from a provincial SIDA (Swedish International Development Cooperation Agency)-sponsored project. The SEA was and appraised in April 2009.
Source: Dusik and Xie, 2009.

Table 1
Overview of interviews.

Interviewee	Title	Date
G01	Professor in Environmental Assessment	January 2011
G02	Engineer, MEP, China	January 2011
G03	Director, Department of Plan-EIA, Appraisal Center for Environment & Engineering, MEP, China	February 2011
G04	Director, Department of EIA, MEP, China	February 2011
S01	SEA project manager	March 2011
S02	Planner	April 2011
D01	SEA project manager	April 2011
D02	SEA project manager	June 2012

The interviews were semi-structured, and were designed with the help of the communicational model as presented in Fig. 1. Both the documentary analysis and interviews analysis were qualitative studies on the content, aiming at investigating whether indicators were used in the cases, which indicators were used in the case, who was involved in the selection of indicators, how indicators were used for communication among the stakeholders and how the use of indicators influenced the communication.

3.3. Survey of SEA practitioners

To give a broader understanding of the role and influence of SEA indicators on communication, an online survey was conducted between June and August in 2012 targeting the general experience of SEA practitioners.

"SurveyXact" developed by Ramboll, in Denmark, was employed for on-line data collection. We sent out 75 invitations to potential respondents including SEA practitioners, planners, stakeholders from sectoral departments, researchers and administrators, by e-mail, of which 46 responded the questionnaire. The survey is designed in three blocks of questions; "general questions related to guidance and the handling of indicators", "questions related to experience in choosing indicators" and "questions related to the experience and impacts of using indicators", of which the last two blocks are designed for this study (the first block is used for another study by the authors (Gao et al., 2013)). The survey focuses on how the indicators are used in SEA and their influence on communication within the SEA process.

4. Results

4.1. General experiences with the use and influence of indicators

Internal communication as defined above refers to the communication between SEA practitioners within the SEA team. The survey investigated whether using indicators in SEA has any influence on this communication. Survey results show that 76% of the respondents experience indicators as useful or very useful in communicating within the SEA team in their practice. When looking into the different stages, the results shows that a high percentage of respondents agree that indicators are useful or very useful in communicating with other practitioners in the stages of screening (83%), scoping (80%), data collecting (80%) and assessment (96%).

All the other communication flows are defined in this study as external communication. Overall, in those SEA stages involving external communication, survey results show that indicators are considered as useful or very useful in evaluation and approval (83%), follow up and monitoring (85%), public participation (67%) and communicating with decision-makers (89%) (Fig. 2). For "communicating with decision-makers" the survey results also show that more than 59% of the respondents find there is not enough communication between SEA practitioners and decision-makers regarding how to use indicators in SEA and planning/decision-making.

From the communication perspective, a general finding can be drawn from the interviews about the challenges and barriers experienced in communicating between the SEA team and the planning team. Different reasons have been mentioned during the interviews. One reason is the different consciousness of environmental considerations: "In China, the consciousness has been built up well in the environmental sector, while in other departments it has been developed quite poorly" (Interview G02, 2011), so the capacity varies between sectors. Further, institutional barriers are raised as causing challenges in communication between the two teams/sectors, like the conflict between different sectors or departments regarding SEA's role in China (Interview G01, G03, 2011), "the decision making mechanism and the conflict between different departments" (Interview G04, 2011), and the still weak capacity of SEA practice in China due to the current infancy of SEA in the country (Interview G01, G03, 2011).

Overall the survey shows that the respondents experience indicators as increasing the external involvement in the SEA process:

- 46% experience increased political involvement (30% as partly, and 22% not),
- 28% experience increased participation of the public/NGOs (33% partly, and 35% not), and
- 37% experience increased communication between authorities and the public/NGOs (30% partly, and 28% not).

Furthermore, external communication is also investigated from two perspectives of the flow direction; one-way communication and the two-way communication. Looking more into the flow of communication, and the effects of it, a more nuanced picture is revealed. Fig. 3 presents results according to three groups of external stakeholders (NGOs, the public and politicians) and the effects of communication. The effects of communication are divided into: (a) "no influence" and "better informed", which represent the one-way flow of communication, and (b) "more listened to", "more engaged in assessment and problem solving" and "more part of decision-making", which represent the two-way flow of communication. The five effect categories represent a ladder of participation with partaking in decision-making as the highest step.

The experience of SEA practitioners reveals that indicators in SEA mostly influence one-way communication with better information to all external stakeholders, among whom the public seem to be most influenced, and politicians the least. For two-way communication a

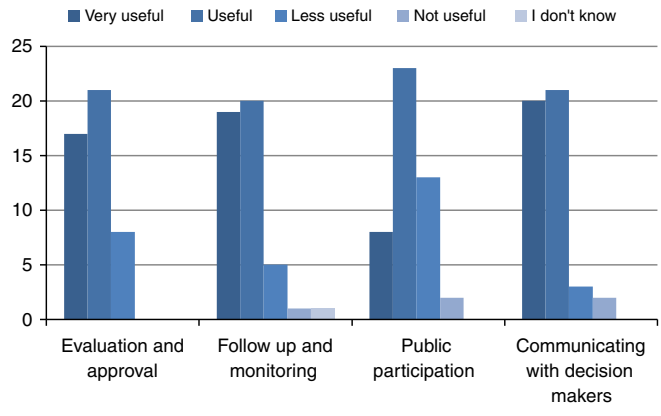

Fig. 2. Experience of contribution of indicators to the improvement in communication in different stages of SEA (N = 46).

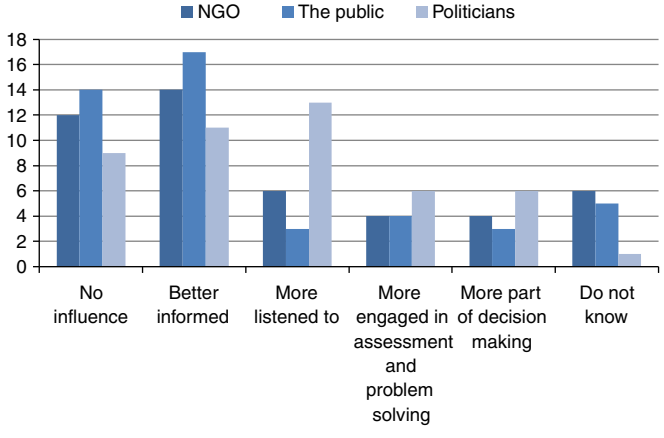

Fig. 3. Experience with how indicators influence the participation of stakeholders in the SEA process (N = 46).

clear result is that indicators mainly influence the political involvement in the SEA process, compared with the public and NGOs.

4.2. Case studies

4.2.1. Selecting indicators through communication

In the Shenzhen case, the SEA called for several consultation meetings with specialists and experts from the environmental sector and the planning sector to develop the list of indicators (Che et al., 2011; Interview S01, 2011). Although no detailed requirements about the consultation process can be found in the guidelines, the SEA team emphasised its key role of leadership in coordinating with experts of 20 research groups and local authorities within 43 government departments. The consultation meetings ensured that the decisions were made according to the local sectoral plans and facilitated the inclusion and implementation of SEA in the proposed plan (Interview S01, 2011). However, no project developer had participated as stakeholder. The interpretation of the reason for that was given by one of the interviewees: "a Master plan is on a very general level [not directly related to any activities], so no project developer as stakeholders actually participated" (Interview S01, 2011). Further, public involvement did not happen in the process of indicator design either, due to the fact that "the average level of publics' concern in environmental issues has not reached a high level of concern in this field" (Interview S01, 2011). According to S01 and S02, currently in China the public pay more attention to the direct results and impacts of the urban plan than the technical process. During the interview, we also gained an impression that the planning team paid quite a lot of attention to public participation and found that the public actually only care about issues directly influencing them or relating to them. Based on this process, a list with a broad scoping of 22 indicators in eleven categories in the field of environment and energy was decided.

The Dali case shows another picture. As an internationally funded research pilot case, a different understanding of the SEA process could be observed. This case significantly emphasises the importance of cooperation and communication among sectors and stakeholders. Besides the SEA team, there was a comprehensive list of departments and organisations involved in this process: local government, environmental protection authority, planning authority, a consultation board with experts from the local Congress and Committee of the Political Consultative Conference (who used to work for environmental sector and construction bureau) and even the vice mayor of Dali who had environmental management experience. In this case, an information sharing and collaboration mechanism was set up. Regular meetings of the cooperating sectors and stakeholders made data and information sharing available, and the SEA team also updated and shared knowledge, understanding, recommendations and suggestions (Interview D02, 2012). Another study on this case further showed that the scope of assessed objectives was intensively discussed and the themes and potential scenarios were considered. Environmental, social and economic issues were included and the environmental issues were paid the most attention (Dusik and Xie, 2009).

Based on this collaboration platform, the SEA team listed the most basic environmental indicators according to the Technical Guidelines for Plan-EIA and the specific context for the Dali case. During the consultation process, "sometimes some indicators were found too detailed to describe the key issues, so only those indicators most concerned were selected while aspects such as noise and waste problem were paid less attention to" (Interview D01, 2011). Based on this cooperation platform, a list of 25 indicators was designed based on seven different themes: resource, biological environment, water, air, solid waste, tourist industry and social culture.

4.2.2. Communicating by using indicators

Sharply different from the impression drawn from the interviews based on general experience, our investigation shows that external communication is conducted more extensively in the two cases, although in both cases the external communication involves mainly various sectors and experts, with low public participation.

In the Shenzhen case, communication between the SEA and the planning process started even before the planning started, according to the description of one of the plan leaders: "The SEA team was involved in (planning) even before the plan began" (Interview S02, 2011). On one hand, this early engagement facilitated the selection of objectives and indicators: "The SEA team developed their indicators by consulting many sectors including our planning team … we commented on their scoping … and the key objectives they would assess" (Interview S02, 2011). On the other hand, using indicators also facilitated the communication between SEA and planning: "Planning also needs support by indicators to decide the final plan, to show the plan's aim and to implement the plan. Therefore from the planning perspective, we prefer a quantitative conclusion with indicators and if there is any, the standard value for indicators" (Interview S02, 2011). Using indicators as a tool to set some environmental requirements: "Indicators are used as the explanation for the environmental aim, for example, we also used several biological and environmental indicators in the Plan to show our environmental aim" (Interview S01, 2011), and communicating with the SEA team also offered the planning team support in balancing the conflict between the different sectors involved:

> *Plan making is a process of balancing interests and we need to take many sectors' demands into account and the result is a trade-off conclusion … as a planner, how to balance the different demands and interests from many sectors, how to implement this plan in many different involved sectors? I think that SEA provided us a relatively systemic methodology in facing these conflicts … It is also easier if you use the SEA's result to convince other relevant sectors involved in the plan making … the most important thing is that we use SEA as a platform to solve those problems.*
>
> [Interview S02, 2011]

Indicators have also been used as a main communication tool as they were used as the explanation for the environmental targets (Interview S01, 2011). Several biological and environmental indicators were selected from the proposed plan to be used as constraints to show the environmental target. For the external communication in the Shenzhen case, it was found that the main communication was within the group of experts, with low engagement of the general public (Interview S01, 2011; Interview S02, 2011). The SEA team shared the SEA report with many sectors and the public, and chose those popular indicators that the public were familiar with (e.g., energy saving indicator). The public did not show much interest in the general development plan, instead, more interest has been observed in detailed planning like construction projects that relate more directly to the private sector (Interview S01, 2011; Interview S02, 2011). We also see this as a challenge for effective public participation in environmental assessment on the strategy level.

In the Dali case, indicators are frequently used in the communication with the cooperating departments especially with the planning team, which is labelled as one of the highlights in this case. One of the experts who was involved in Dali case mentioned:

> *As one of the very few cases achieving the aim of early integration of SEA in planning in China, in the Dali case several rounds of negotiations and consulting between the SEA team and the planning team were conducted, the early integration of SEA in planning process provided opportunities to the local planners to adjust the plan during plan making.*
>
> [Interview G02, 2011]

Later in deciding the key assessment objectives, the SEA team also involved the public by undertaking a survey with tourists. The SEA team finds the survey "provided certain information in giving a broad scope in

helping decide on the key objectives" (Interview D01, 2011). However, when communicating with decision-makers, a rather interesting finding is that the SEA team tried to avoid using too detailed information, due to the consideration that "it needs more information than indicators can provide to influence the decision-making" (Interview D01, 2011). But by initiating communication at a very early stage and involving decision-makers in the SEA process, this SEA had the opportunity actually to influence the decision-making process, by developing indicators of relevance for the decision-maker (Interview D01, 2011).

4.3. Discussion of findings

In terms of how indicators are designed, experience from the two Chinese SEAs shows a changing understanding of approaches for SEA. Although the indicator lists in both SEA cases are still centrally based on the national guidelines and have a very strong physical/biological focus, the process of selection of indicators, however, shows a trend towards a more communicative approach. In the Shenzhen case, a joint team was formed to develop indicators. In the Dali case, this trend is even more obvious, where information sharing and collaboration was set up to by holding regular consultation meetings, which not only provided a platform for stakeholders to participate, but also proactively included them in the decision making arena. When indicators were chosen in this way, a clear turning from a pure technical understanding of SEA practitioners to a more communicative and comprehensive approach can be assumed.

In terms of how indicators are applied, both the cases and the survey results suggest that the application of indicators in the Chinese SEA system is still more scientific than communicative. The survey clearly shows that indicators are found more useful in internal communication than in external communication, which indicates that indicators are more used for technical purposes for communicating between practitioners on professional issues. Both of the two cases also show that indicators were mainly used in the internal communication, especially in the Shenzhen case, where indicators were used to influence the communication among experts. Although the case study shows that external communication between SEA practitioners, stakeholders and decision-makers is frequently mentioned and has even been regularised with the help of the cooperation mechanism by taking indicator design as one of the common goals to facilitate involvement indirectly, especially in the Dali case, the influence of indicators on external communication has been identified as limited. Besides, public and NGO participation was not really well implemented in the two case studies, due to the strategic nature of the plans. A positive finding from the survey is practitioners' experience that indicators influence communication and in general increase participation. However, this participation is mainly through one-way communication in terms of informing, and the two-way communication mainly involves politicians.

Although no research can be found by studying the cases where communication in SEA has been influenced by indicators, some general international experience can provide insight into understanding indicators' using and communication in SEA in a global context. On one hand, there are examples where indicators gained plenty of attention in SEA. In UK, the intensive using of indicators in SEA is supported by an extensive list of sources for indicators. And by giving explicit guidance on selecting and using indicators in the different stages of SEA, the British guidance (Office of the Deputy Prime Minister, 2005) emphasises the openness towards stakeholders in the communicative side of using indicators. In contrast to this, on the other hand, examples are found where SEA is based on almost no indicators, like in Denmark. The Danish Guidance on Environmental Assessment of Plans and Programmes (Ministry of Environment, Denmark, 2006) underlines that the use of indicators should be few, simple and based upon existing knowledge, due to economy consideration. Chinese practical experience is found standing between these two approaches in using indicators (Gao et al., 2010).

5. Conclusion

Along with increasing discussion and emphasis on communication in SEA, indicators as one of the tools to facilitate communication in terms of information transfer, consensus building and goal setting, deserve careful study. This article explores how indicators influence the communication in SEA between different stakeholders involved in SEA. Based on two SEA cases in China, we analysed case-based materials and interviewed SEA practitioners and planners involved in the cases. Besides, in order to have a broader view of practitioners' understanding and experience in using indicators in SEA, this study also uses data from interviews with experts and administrators, and a survey among practitioners based on their experience in Chinese SEA practice. To explore the influence of indicators on communication, a conceptual communication model is set up to demonstrate the relationship between those involved in the communication. According to this model, the communication occurring in SEA can be divided into internal communication and external communication in terms of communication flow boundary, through flow direction in either one-way channels or two-way channels.

Based on this illustration, the results of the case studies and survey show the following findings. Firstly, in selecting indicators, the approach used in both two cases reveals changes. Instead of being as a purely technical process taken by the professionals, a more engaging process is identified which is more open for including the stakeholders and planners in designing and developing indicators. Secondly, in terms of using indicators, it is shown generally that at the moment indicators are used mainly for scientific purposes rather than communicative purpose in Chinese SEA practice, due to the fact that it is more common to use indicators in internal communication among SEA practitioners rather than in external communication, although the practitioners perceive indicators as useful in increasing both internal and external communication. For the external communication between the SEA team and the planning team, the general experience indicates challenges and, due to different consciousness of environmental considerations, conflicting perceptions of the role of SEA and low capacity building in some areas like the planning sector. However, the results from the two cases show the early involvement of SEA in the planning process and better capacity building — and a reduction of those barriers.

The results also show an increasing political involvement, especially — more than for the public and NGOs. Finally, the influence of indicators on communication is mainly seen in relation to one-way communication in terms of providing information. The influence on two-way communication in terms of engaging stakeholders in a dialogue, assessment and problem solving/decision-making is found to be limited. This finding, together with the findings from the two cases, also suggests that participation of and feedback from the public and NGOs is not very well implemented in Chinese environmental assessment practice on a strategic level.

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